

BELLCOMM. INC.

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WASHINGTON, D. C. 20024

B70 11029

SUBJECT: Apollo 14 Abort Capability
Beyond the Nominal DPS Abort
Time - Case 310

DATE: November 12, 1970

FROM: D. R. Anselmo
M. K. Baker

MEMORANDUM FOR FILE

[REDACTED]

The DPS abort capability can be extended to as long as sixty-one hours after perilune for Apollo 14. This can be accomplished by dropping the SM prior to the abort maneuver. The time from abort to reentry can be as short as fifteen hours.

The Apollo 14 trajectory is targeted to provide DPS abort capability after perilune passage in the event of failure to perform the LOI maneuver. The DPS abort capability extends to about 97 1/2 hours ground elapsed time (GET), which is approximately 17 hours after nominal LOI time. Beyond this point the return to earth requirements exceed the DPS capability alone for the normal CSM + LM configuration. The use of the DPS plus the APS propulsion would extend this capability for an additional 25 hours to about 122 hours GET. In order to extend the return to earth capability further the DPS + APS could be used after jettisoning the SM. In this case the return capability is extended through perigee on the transearth trajectory and would permit a return time of as low as 10 hours from an abort point at 152.5 hours GET. The disadvantage of this mode being the use of an APS docked maneuver.

Another abort option is available which could eliminate the need for the use of the APS in a docked maneuver. The ΔV capability of the DPS if the SM is jettisoned is about 4800 fps. An abort from the transearth trajectory at approximately 146 hours GET will provide a safe reentry 13 hours later at about 159 hours GET.

The attached figure provides parametric data illustrating the abort options discussed above. The data presented here is based on conic trajectories, thus the ΔV requirements and return times should not be considered as exact.

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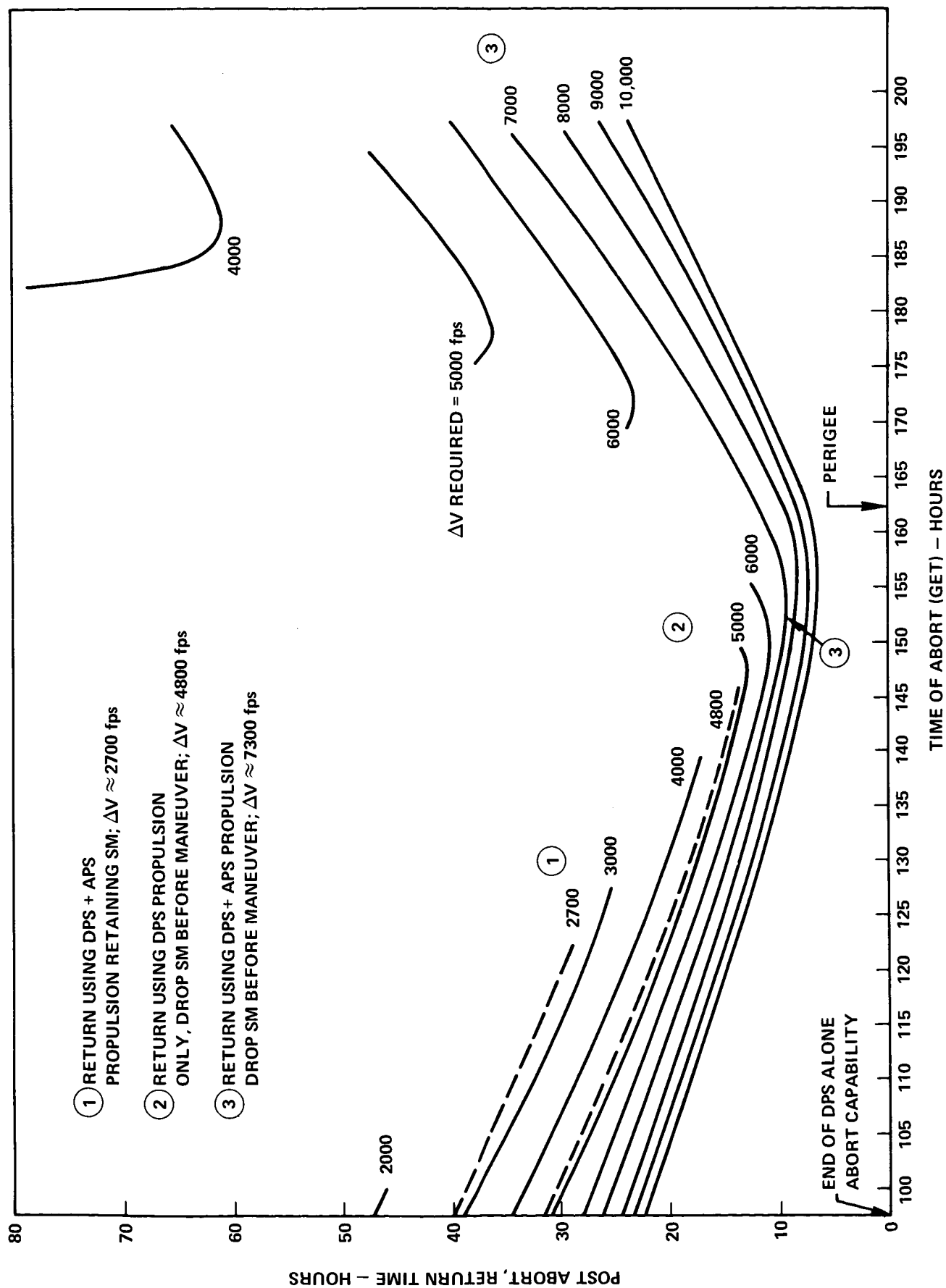


FIGURE 1 - ΔV REQUIRED FOR POST-PERILUNE ABORTS FOR JANUARY 31, 1971
LAUNCH TO FRA MAURO

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